

# Wide Bank 28

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## Space-efficient, cost-effective digital service connection for a variety of platforms and applications

With the Wide Bank® 28 family of products, standards-based M1-3 multiplexing takes a giant step forward. The Wide Bank 28 is a family of carrier-class solutions that significantly increases the number of DS1/E1 service delivery ports that can be deployed at the same time that it dramatically lowers DS1/E1 port deployment costs.

Wide Bank 28 solutions can be deployed in conjunction with DCS, SONET ADM, LDS, Frame Relay and ATM platforms. The Wide Bank 28's small footprint solves the space problem that often limits how many DS1 or E1 connections can be supported per rack. By using DS3 or STS-1 service modules to support the equivalent of 28 DS1 or 21 E1 ports in a single rack unit space, Wide Bank 28 solutions can support up to 672 T1 or 504 E1 connections in one 23-inch rack. For high-density applications, the Fan Faceplate Option for the Wide Bank 28 makes it possible to configure up to 40 Wide Bank systems operating in a

single equipment rack, providing support for up to 1,120 DS1 or 840 E1 ports.

Upstream management capabilities, high rack density, and low T1/E1 costs, all standard features of the Wide Bank 28 solution, combine to provide a solution that delivers more control and capacity in less space than competitive offerings – at a much lower cost.

### Reduced space requirements

The Wide Bank 28 dramatically reduces the amount of space required to deploy T1/E1 by supporting up to 28 DS1 or 21 E1 service connections in only a single rack unit of space. Older generation equipment requires an entire rack full of equipment to provide as much capacity. The Wide Bank 28's reduced space requirements make it cost effective to deploy DS1/E1 ports to support growing requirements in a variety of environments. While saving space is an important consideration for most deployments, Wide Bank 28's small footprint is particularly beneficial for sites such as POPs, collocations, central offices, and digital loop carrier cabinets, where space is at a premium and the size of previously available equipment makes expansion impractical or prohibitively expensive.

### Lower-cost for deploying and delivering services

Wide Bank 28 solutions make it possible to provision more T1/E1 ports in virtually any platform, greatly increasing the maximum number of ports that can be deployed and services that can be delivered to customers. Adding the Wide Bank 28 to a platform results in a significant reduction in cost per DS1/E1. The bottom line? More revenue generating opportunity at a lower cost than with competitive solutions — and in much less space.

### Robust remote management facilities

The Wide Bank 28 solution offers unsurpassed remote management facilities that eliminate the need to physically replace cards or set switches to isolate and differentiate among equipment, line, electronic, and network errors. Support of Simple Network Management Protocol (SNMP) enables integration of control of the unit with popular SNMP management systems through a direct Ethernet connection. A Command Line Interface (CLI) provides remote management via an RS-232 Telnet or local management connection. Bit Error Rate Testing (BERT) capabilities automatically test internal data paths. Remote terminal management allows electronic protection switching of individual interfaces, eliminating costly truck rolls and service interruptions.

### Modular design to accommodate evolving needs

Demand for services is growing rapidly, making scalability a must for cost-effective, fast, and efficient network expansion. Wide Bank 28 solutions accommodate changing needs with a modular design that allows deployment of from 4 to 28 DS1 ports in 4-port increments, or 3 to 21 E1 ports in 3-port increments to accommodate demand for more capacity as it occurs. When additional ports are needed, capacity can be increased quickly and easily simply by adding one or more DS1 or E1 interface cards (to a maximum of seven cards per Wide Bank 28).

### Unique sparing and redundancy implementation for high reliability

The Wide Bank 28 system's modular approach to sparing and redundancy reduces downtime and helps ensure that the system remains available. The typical approach to low-speed (DS1 or E1) hardware redundancy is to use an entire spare low-speed card to replace a single channel that fails, leaving the remaining channels unprotected in the event of another failure. With Wide Bank 28, if a single channel fails, only a single channel on the spare low-speed card is used, ensuring that there will be a spare available to provide backup if another low-speed channel should fail. Additional features such as hitless electronic and circuit protection, dual controllers, dual power supplies with dual power inputs, and fuseless high-voltage line protection all contribute to very low downtime and very high system reliability.

## Components:

- Controller unit (2)
- Quad DSI units (8)
- Three port EI unit (8)

## Product Includes:

- Ports
  - Two independent -48VDC power input connectors
  - Four BNC coax connectors
  - Two 64-pin female champ connectors
  - BNC coax 44.768 MHz external clock input
  - 4-pin major/minor alarm connector
  - 9-pin female RS-232 management port
  - 25-pin female RS-232 TL-I automatic outbound alarm
- Message port
  - RJ45 10Base-T SNMP/Ethernet management port
- Accessories
  - User manual
  - 19 in./23 in. rack mounting brackets
  - Major/minor alarm cable connector
  - Connector release tool
- Software
  - SNMP, TLI and Telnet Agent embedded software
  - Command Line Interface embedded software
  - Pilot™ GUI EMS

## Options:

- MSO (Maintenance Service Option)
- FFO (Fan Faceplate Option)

## Management:

- RS-232 port for command line management
- Ethernet port for SNMP and Telnet sessions
- TLI Alarm Correlation and Remote Provisioning

## High-Speed Interface:

- Channelized DS3
  - Line build out:
    - Short: 0-50 ft.
    - Normal: 50-450 ft.
  - Line rate: 44.736 Mbps
  - Line code: Bipolar with three-zero substitution (B3ZS)
  - Framing format: M23 and C-bit parity
  - Transmit Impedance:  $75\Omega \pm 5\%$  resistive, unbalanced
  - Transmit Jitter Attenuation: Meets ANSI T1.102
  - Transmit Amplitude: Meets ANSI T1.102 pulse mask with 0.36 to 0.85 Vp
  - Transmit Length (cable) 500 ft. to cross connect
  - Receive Sensitivity: -10 dB w/r DSX-3 120 mVp to 900 mVp input range with automatic gain control circuit
- STS-1
  - Line rate: 51.84 Mbps  $\pm 20$  ppm
  - Line code: Bipolar with three-zero substitution
  - Transmit impedance:  $75\Omega \pm 5\%$  resistive, unbalanced
  - Framing: STS-1
  - Payload mapping: Asynchronous, VT 1.5 SPE for

clear-channel transport

- Transmitter: Meets the pulse mask and eye diagram interface signal requirements as specified by ANSI T1.102 and Telcordia™ GR-253-CORE for all cable lengths up to 450 ft. to cross-connect
- Receiver: Accepts signals up to 500 ft. from the cross-connect that meets the criteria of ANSI T1.102 and Telcordia™ GR-253-CORE at the interface

## Low-Speed Interface:

- DSI
  - Line build out: 0-655 ft.
  - Line framing: Transparent to DS4 or ESF
  - Line interfaces: Two 64-pin Amp connectors
  - Line rate: 1.544 Mbps  $\pm 32$  ppm
  - Line code: AMI or B8ZS selectable
  - Impedance:  $100\Omega \pm 5\%$  resistive, balanced
  - Transmit Jitter Attenuation: Meets ANSI T1.403, T1.102 and AT&T 62411
  - Transmit Amplitude: Pulse curve amplitude, 2.7 to 3.3 Vp per ANSI (T1.102 and T1.403)
  - Transmit length (cable): 644 ft. ABAM or equivalent to cross-connect
- EI
  - Receive line rate: 2.048 Mbps
  - Receive impedance:  $120\Omega$  (balanced) meets minimum return loss requirements from ITU-T/G.703
  - Receive sensitivity: 600 mVp to 3.3 Vp input (minimum signal tolerance referenced from nominal (3V) -13 dB)
  - Transmit line rate: 2.048 Mbps.  $\pm 50$ bps (32 ppm)
  - Transmit amplitude: 3.0 V (nominal)
  - Transmit pulse shape: Meets requirements of ITU-T/G.703
  - Transmit Jitter: Meets ITU-T/G.823 recommendations
  - Line Code: HDB3
  - Transparent to EI framing or lack of framing (Lightning surge protection and power induction protection per FCC part 68 and GR-1089 -CORE)

## Network Standards:

- ANSI
  - T1.102-1993; T1.107-1995
  - T1.403-1996; 404a-1994
  - T1.404a-1996, T1.105
- ITU G.747 (EI version)
- CCITT Recommendation V.11
- Telcordia™ GR-499-CORE
- AT&T 62411 (Stratum 4 enhanced TI CPE)

## Redundancy:

- Controller, DS3 1:1 and power conversion redundancy with second controller card
- 1:7 or 4:28 DSI electronics redundancy with spare Quad DSI card
- 1:7 or 3:21 EI electronics redundancy with spare 3-port EI card

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## Technical Specifications for the Wide Bank 28

### Clocking:

- Network: Recovered from STS-1 or DS3 network receive signal
- Local: On-board stratum 4E clock source
- External: 44.736 MHz (DS-3) or 51.84 MHz (STS-1) external clock

### Alarms:

- External alarm contacts for critical and non-critical alarms
- Normally open and normally closed pinout
- Front panel alarm cutoff switch (ACO)

### Performance Monitoring Alarms:

- Telcordia™ GR-474-CORE, GR-820-CORE

### Diagnostics:

- CSU Loopback/Loopup
- C-bit Loopback/Loopup
- NIU Loopback/Loopup
- Internal BERT
- Integrated NIU
- Startup- and Self-test

### Power:

- Nominal -48 VDC
- Optional battery unit
- Optional power converter/battery charger
- Input voltage: -42 to -60 at 1 amp maximum
- Input current: 0.75 amp maximum, FFO fully redundant system; 0.67 amp maximum, non-FFO
- Internal fuseless overvoltage and overcurrent protection
- Power consumption: 36 W FFO, fully redundant system; 33 W non-FFO

### Regulatory and Certifications:

- NEBS Level 3 certified – type 2 and 4 (earthquake zone 4)
- Telcordia™ GR-63-CORE, GR-1089-CORE
- North American Regulatory Standards UL 1950 Edition 3
  - Equipment compliance to current (1996) National Electrical Code (NEC)
- FCC Part 15 Class A, Part 68
- CSA
  - Industry Canada CS-03
  - Canadian Safety Association Compliant
- Japanese Approvals Institute for Telecommunications Equipment (JATE)

### Physical:

- Height: 1.75 in. (4.45 cm)
- Depth: 10 in. (25.4 cm)
- Width: 17 in. (43.2 cm)
- Weight: 10 lb. (4.5 kg) fully loaded
- Rackmount: 19 in. (48.26 cm) or 23 in. (58.42 cm)

### Environment:

- Operating temperature range: 23 °F to 131 °F (-5 °C to 55 °C)
- Relative humidity (noncondensing): 0% to 98%
- Altitude: 0 to 15,000 ft. (0 to 4,572 m)

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